CLAIMS

Claim 1. A heat sink for a heat generating device, comprising:

an enclosed metal chamber, to be in contact with said heat generating device;

a two-phase vaporizable coolant recycled in said chamber to remove heat from said heat generating device;

a flow path comprising an upper section and a lower section, said upper section and said lower section being separated by an isolation plate and connected by a conveying conduit at ends for said coolant to flow from said upper section to said lower section, said upper section being in contact with the inner top wall of said chamber for vapor condensation and heat dissipation; said lower section functioning as part of a recycling passage for the condensed coolant;

a conveying conduit at one common end of the upper section and the lower section; and

a wick evaporator in contact with said lower section to draw in said condensed coolant from said lower section of said flow path by capillary attraction force, and said coolant collected within said evaporator waiting to be vaporized by the heat from said heat generating device.

Claim 2. A heat sink for a heat generating device, comprising:

an enclosed metal chamber, to be in contact with said heat generating device;

a two-phase vaporizable coolant recycled in said chamber to remove heat from said heat generating device;

a flow path comprising an upper section and a lower section, said upper section and said lower section being separated by an isolation plate and connected by a conveying conduit at ends for said coolant to flow from said upper section to said lower section, said upper section being in contact with the inner top wall of said chamber for vapor condensation and heat dissipation; said lower section functioning as part of a recycling passage for the condensed coolant;

a conveying conduit at one end of the upper section; and

a wick in said lower section, a portion of said wick functioning as an evaporator and the other portion of the said wick functioning as a liquid passage to draw said condensed coolant from said upper section by capillary attraction force through said conveying conduit; and said coolant collected within said evaporator waiting to be vaporized by the heat from said heat generating device.

Claim 3. The heat sink as described in claim 1, wherein said heat generating device is an integrated circuit (IC) chip.

Claim 4. The heat sink as described in claim 1, wherein said wick is selected from the group consisting of sintered copper powder, sintered nickel power and sintered stainless-steel powder.

Claim 5. The heat sink as described in claim 1, wherein said wick is selected from the group consisting of metal mesh and metal cloth.

Claim 6. The heat sink as described in claim 1, wherein at least one of said upper section and said lower section is selected from the group consisting of space and parallel grooves.

Claim 7. The heat sink as described in claim 6, wherein said grooves have a cross-section selected from the group consisting of: V-shaped, triangular, rectangular and trapezoidal.

Claim 8. The heat sink as described in claim 1, further comprising a guiding plate mounted on top of said evaporator to allow part of coolant condensed on the inner top surface of said chamber to flow downward back to the evaporator.

Claim 9. The heat sink as described in claim 8, wherein said guiding plate is of meshed metal.

Claim 10. The heat sink as described in claim 1, wherein said upper section and said conveying conduit are integrated with the top of said chamber as a unitary cover.

Claim 11. The heat sink as described in claim 1, wherein said lower section and said conveying conduit are integrated with the bottom of said chamber as a unitary base.

Claim 12. The heat sink as described in claim 1, wherein said wick is an array of pins spaced apart to allow the space between the pins to capillarily absorb the coolant.

Claim 13. The heat sink as described in claim 1, wherein said enclosed chamber is rotated from a horizontal position to a vertical position.

Claim 14. The heat sink as described in claim 1, further comprising a second capillary element placed in said conveying conduit.

Claim 15. The heat sink as described in claim 1, wherein a layer of corrugated metal selected from the group consisting of wire mesh and wire cloth, forming parallel grooves is placed in the upper section.

Claim 16. The heat sink as described in claim 2, wherein said heat generating device is an integrated circuit (IC) chip.

Claim 17. The heat sink as described in claim 2, wherein said wick is selected from the group consisting of sintered copper powder, sintered nickel power and sintered stainless-steel powder.

Claim 18. The heat sink as described in claim 2, wherein said wick is selected from the group consisting of metal mesh and metal cloth.

Claim 19. The heat sink as described in claim 2, wherein said upper section is selected from the group consisting of space and parallel grooves.

Claim 20. The heat sink as described in claim 19, wherein said grooves have a cross-section selected from the group consisting of: V-shaped, triangular, rectangular and trapezoidal.

Claim 21. The heat sink as described in claim 2, further comprising a guiding plate mounted on top of said evaporator to allow part of coolant condensed on the inner top surface of said chamber to flow downward back to the evaporator.

Claim 22.The heat sink as described in claim 2, wherein said upper section and said conveying conduit are integrated with the top of said chamber as a unitary cover.

Claim 23. The heat sink as described in claim 2, wherein said enclosed chamber is rotated from a horizontal position to a vertical position.

Claim 24. The heat sink as described in claim 2, further comprising a second capillary element placed in said conveying conduit.

Claim 25. The heat sink as described in claim 2, wherein a layer of corrugated metal selected from the group consisting of wire mesh and wire cloth forming parallel grooves is placed in the upper section.

Claim 26. The heat sink as described in claim 2, wherein said wick is replaced with a layer of corrugated metal selected form the group consisting of wire mesh and wire cloth.

Claim 27. The heat sink as described in claim 26, wherein a sheet selected from the group consisting of wire mesh and wire cloth is added on top of said corrugated metal selected from the group consisting of wire mesh and wire cloth to form closed parallel microchannels in said lower section.

Claim 28. The heat sink as described in claim 2, wherein said isolation plate is made from a group consisting of wire mesh and wire cloth.